# Chick'n Fiber: Development of Breading Mix using Banana (*Musa sapientum var. lacatan*) Peel as a Good Source of Dietary Fiber

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## INTRODUCTION

Banana is one of the fruit crops that is mostly consumed and produced in the country (PSA, 2017). As a result, the banana peels are neglected as a waste. The DF intake of Filipino adults was low due to the increased consumption of processed and deep-fried foods from fast-food restaurants (Kritz, 2017). With this, there is an increased prevalence of non-communicable diseases such as cardiovascular diseases, diabetes, and hypertension (Angeles-Agdeppa et al., 2019).

**BM was selected in this study as it is commonly used due to the following:**

a) high consumption of fast-food items;
b) increasing demand for the breader segment in Asia;
c) Filipinos are known to consume more animal sources of protein in their diet; and
d) commercialized BM does not contain DF.

This study will be most beneficial to the adults with low DF intake, as it can help increase DF intake and even lower fat consumption from fried foods.



**Keywords**

**BM/s**- Breading Mix/es
**PFDBP** - Partially Fine Dried Banana Peel
**APF** - All Purpose Flour
**DF** - Dietary Fiber
**TDF** - Total Dietary Fiber
**FA** - Fat Analysis
**SPC** - Standard Plate Count
**YMC** - Yeasts and Molds Count
**QDA** - Qualitative Descriptive Analysis
**%RNI** - Percent Recommended Nutrient Intake
**ANOVA** - Analysis of Variance
**AOAC** - Association of Official Analytical Chemists
**DOST-FNRI SEL** - Department of Science and Technology Sensory Evaluation Laboratory

## OBJECTIVES

The research aims to develop an acceptable BM containing sources of DF for adults.

**Specific objectives:**

(1) to develop a BM containing good source of DF;
(2) determine the most acceptable formulation of BM with BP in terms of hedonic test; and
(3) to evaluate the developed BM using chemical (i.e.,TDF and FA), and microbiological analysis (i.e., SPC and YMC).

## METHODOLOGY

### Study Design
- Quantitative Research

### Data Analysis
- Weighted Mean
- One-Factor Repeated Measures ANOVA
-Multiple comparisons using Bonferroni Test
- Radar chart

### Study Site

**Preparation & Production Area**
- In a residential area in Paco, Manila City

**Chemical and Microbial Analysis**
- Intertek Philippines

**Sensory Evaluation (QDA and Hedonic Test)**
- DOST-FNRI SEL

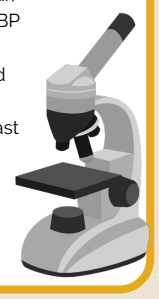
### Study Population



- 11 trained panelists for QDA
- 50 untrained panelists (adults aged 21 to 59 years old) for final Hedonic Testing

### Research Instruments

- PFDBP (Lacatan cultivar)
- BM Formulations (PFDBP substitution with APF) (Control, 25:75, 30:70 and 35:65)
- Pan-fried Chicken Breast Fillet
- Laboratory Analysis (AOAC 20th edition)
- QDA Score Sheet
- 9-point Hedonic Scale



## RESULTS

**Table 1. Percent RNI of Four Breading Mix Formulations**

| Percent RNI (%) | Control | BM A | BM B | BM C |
|---|---|---|---|---|
| Actual TDF (per 25 g serving) | 0 | 2.36 | 2.76 | 3.21 |
| %RNI (%)* | 0 | 9.4-11.8 | 11.0-13.8 | 12.8-16.1 |

**Percent RNI are based on the FNRI reference of the RNI of adults.*

Among the four BM formulations, BM control had no %RNI, whereas the other three BM formulations are considered good sources of DF per 25 g serving size.

**Table 2. Microbiological Characteristics of Three Breading Mix Formulations**

| Microbiological Test | Maximum acceptable level of organisms* | BM A | BM B | BM C |
|---|---|---|---|---|
| Yeasts and Molds Count | 100 CFU/g | <10 CFU/g | <10 CFU/g | <10 CFU/g |
| Standard Plate Count | 10,000 CFU/g | 4,300 CFU/g | 12,000 CFU/g | 1,100 CFU/g |

**For one sample tested*

All BMs had the same values for the YMC test and this shows that BM A, BM B, and BM C had acceptable levels of microorganisms. However, for the SPC test, only BM B had a value that is above the acceptable level. Therefore, only BM A and BM C were used for the sensory evaluation.

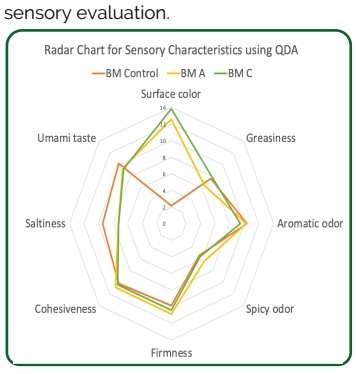



**Figure 1. Radar Chart for Sensory Characteristics of Breading Mix Formulation as Applied on Pan-fried Chicken Breast Fillet using QDA**

BM Control significantly had the highest sensory evaluation ratings. Moreover, BM C had the highest score for surface color and greasiness, while BM A had the highest rating for spicy odor, firmness, and cohesiveness.

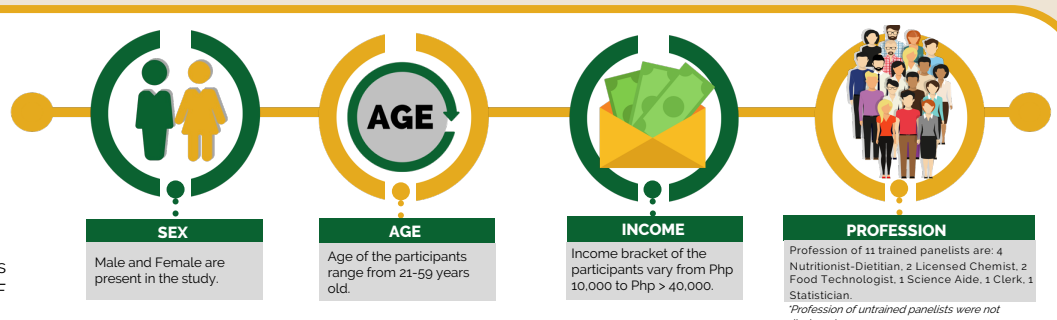



**Figure 2. Demographic Profile of Trained and Untrained Panelists**

**Table 3. Total Fat Percentage of Three Breading Mix Formulations as Applied on Pan-fried Chicken Breast Fillet per 100 gram sample.**

| Food Composition | Control | BM A | BM C |
|---|---|---|---|
| Total Fat Percentage (%) (per 100 gram sample) | 11.35 | 6.06 | 10.1 |

Among the three BM formulations, BM A had the lowest percentage of total fat, while BM Control had the highest.

**Table 4. Mean Scores for Consumer's Sensory Evaluation of Breading Mix Formulations as Applied to Pan-fried Chicken Breast Fillet**

| | Mean Scores | | |
|---|---|---|---|
| Sensory Characteristics | Control | BM A | BM C |
| Aroma | 7.84 | 7.24 | 6.7 |
| Flavor | 7.56 | 6.92 | 6.76 |
| Texture | 7.66 | 6.94 | 7.30 |
| Color | 7.70 | 5.40 | 5.34 |
| Appearance | 7.88 | 5.72 | 5.64 |
| Overall acceptability | 7.74 | 6.48 | 6.10 |
| Interpretation | Like very much | Like slightly | Like slightly |

All of the breading mix formulations received a mean evaluation score ranging from 6 (Like slightly) to 8 (Like very much), from the sensory evaluation among 50 untrained food panelists or consumers. Furthermore, in terms of comparison among samples with banana peel, BM A received a higher acceptability rating compared to BM C formulation.

## CONCLUSION

Overall, increasing amounts of PFDBP per 25g serving of BM A, BM B, and BM C, also increases the dietary fiber content with 2.36g, 2.76g, and 3.21g respectively. Furthermore, the BMs are considered good sources of the said nutrient.

All BM formulations were used for the sensory evaluation, except for BM B due to its high SPC count (12,000 CFU/g). BM A and BM C exhibited significant results in terms of the capacity to absorb less oil during frying with a total fat percentage of 6.06% and 10.1% respectively.

Based on the results of the hedonic test and chemical analysis, BM A is the most suitable formulation for adults aged 19 to 59 years old.

## ACTUAL SAMPLE



ACTUAL BREADING MIX A




BREADING MIX AS APPLIED ON PAN-FRIED CHICKEN BREAST FILLET

## REFERENCES

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